RJP:cms 03/26/04 266063.doc
PATENT

Attorney Reference Number 4616-68296/RJP
Express Mail No. EV 339208530 US

Amendments to the Specification

Please add the following new header and paragraph on page 1, immediately following the title:

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–CROSS REFERENCE TO RELATED APPLICATIONS

This is a continuation of Application No. 10/416,902, filed May 15, 2003, which is the National Stage of International Application No. PCT/CA2001/01589, filed November 15, 2001, which claims the benefit of Provisional Application No. 60/248,864, filed November 15, 2000, all of which applications are incorporated herein by reference.--

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NOVEL TYPE III SECRETION PATHWAY IN *AEROMONAS SALMONICIDA*, AND USES THEREFOR

FIELD OF THE INVENTION

This invention relates to bacterial secretion systems, and in particular to a newly identified and characterized type III secretion system in *Aeromonas salmonicida*. The invention also encompasses the use of components of the novel secretion system in immunoprotection against *A. salmonicida* infection, as well as other diagnostic and therapeutic uses thereof.

BACKGROUND OF THE INVENTION

Various publications are referenced throughout this publication, and full citations for each of these publications are provided at the end of the Detailed Description.

Aeromonas salmonicida, a Gram-negative, facultatively anaerobic, non-motile, rod shaped bacterium, growing at temperatures around 20°C, is the etiological agent of furunculosis in salmonids, causing most severe economic losses in production farms of salmon and trout. The disease is characterised in the sub-acute or chronic form by the presence of haemorrhagic necrotic lesions in the gills, gut and muscle, while in the acute form fish die apparently from toxaemia without showing particular external signs.

Due to the high contagiousity of the disease and the high mortality in salmon of all ages, particularly in the sea water growers, large amounts of antibiotics are used in closed and open waters for therapy of furunculosis (Munro and Hastings, 1993). Vaccination has become an important strategy to control furunculosis in fish farms (Ellis, 1997). However, the currently applied whole cell antigen vaccines seem to show considerable variability in efficacy, the origin of which remains currently unexplained (Thornton et al., 1993).

Knowledge of the mechanisms of pathogenicity of *A. salmonicida*, and in particular of the main virulence factors involved, is essential in the development of efficient strategies to prevent outbreaks of furunculosis caused by *A. salmonicida*. Currently, several potential virulence factors of *A. salmonicida* have been reported, including a surface-layer protein (Chu et al., 1991), the hemolysins ASH1, ASH3, ASH4 (Hirono and Aoki, 1993), salmolysin (Titball